REMARKS

Claims 1 to 18, 21 to 25, 27, 41, 44, 47, 49, 50 and 52 are under examination in this application. Claims 28 to 40 were previously withdrawn as directed to a non-elected invention. Claim 26 was previously cancelled without prejudice. Claim 19 has been cancelled herein without prejudice.

Claims 1, 2, 4, 8, 10, 11, 14, 15, 21, 23, 25, 41, 44, 47, 49, 50 and 52 have been amended for clarity to more particularly define the invention. Support for these amendments is found throughout the specification and in the original claim language as set forth below. Support for the amendments to claims 1, 2, 21 and 23 can be found at page 15, last full paragraph, and elsewhere in the application, as filed. No new matter is added by these amendments and their entry is respectfully requested. In light of the amendments presented herein and the following remarks, applicant respectfully requests reconsideration of the pending application and allowance of the pending claims to issue.

Rejection under 35 U.S.C. 112

The Examiner has rejected claim 1 under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. Specifically, the Examiner states that the claim contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the art that the inventor had possession of the claimed invention at the time the application was filed. Specifically, the Examiner has stated that, while the Applicant discloses the selection of a calcium sensitive chemiluminescent material to obtain a short period of time between the flash emitted by the ultraviolet light source and the emission of light by the calcium-sensitive luminescent material (as seen in page 15), the Applicant does not disclose the selection of calcium caging compound for this purpose.

Applicant has amended claim 1 accordingly. Specifically, Applicant has removed the selection of calcium caging compound for this purpose. Applicant has also amended claims 21 and 23 in a similar fashion. Finally, Applicant has added the "wherein" language found in claims 1, 21 and 23 to Claim 2, since Claim 2, as amended, is no longer dependent on Claim 1.

Rejection under 35 U.S.C. 103

The Examiner has objected to claims 1-7, 10-12, 14-17, 19, 21-25, and 27 as obvious over Pankratz et al [US 5,876,935] in view of Liotta et al [US 5,942,407]. Specifically, the Examiner states that, with respect to claims 1, 2, 21, 23, and 25, Pankratz et al teach a method comprising the steps of combining with a sample a binding reagent labeled with a luminescent molecule that is capable of binding to an analyte, contacting the sample with another binding reagent that can be biotinylated, immobilized on a solid support such as superparamagnetic microspheres by means of avidin or streptavidin, so that a complex with the analyte bound to the labeled binding reagent is formed, activating the luminescent label in the solid support-free sample or in the complex bound to the solid support, and determining the presence of analyte in the sample by detecting the light emitted from the activated luminescent label. The Examiner states that Pankratz et al further teach that the label can be aequorin, and is activated by adding sufficient calcium ions. The Examiner concedes that Pankratz et al fails to teach that the calcium ions are added by using ultraviolet light to effect the release of calcium from a caged calcium compound.

The Examiner further states that Liotta et al teaches the use of a caged calcium compound immobilized in a support and using ultraviolet light to activate the compound in order to extend the duration of light emission resulting from analyte detection.

The Examiner therefore contends that it would have been obvious to include a caged calcium compound immobilized in a support and ultraviolet light to activate the compound in the method of Pankratz et al, in order to extend the duration of light

emission resulting from analyte detection.

The Examiner has also stated that while neither of Liotta et al or Pankratz et al teach that the calcium-sensitive luminescent material is selected to obtain a period of time between the flash emitted by the ultraviolet light source and the emission of light by the calcium-sensitive luminescent material, the calcium-sensitive luminescent material used by both Liotta et al and Pankratz et al is aequorin, and therefore, such a period of time would be present in the method of Pankratz et al in view of Liotta et al.

The Examiner does acknowledge that the prior art does not teach that there is a period with no light emission between the pulse of ultraviolet light effecting calcium release and the emission of luminescence by the luminescent material.

Although Liotta hypothesizes about the use of a caged calcium compound as a potential way of activating the calcium activated luminescent material, Liotta et al do not actually use such a compound. Instead, Liotta et al use a calcium salt. In Liotta et al, calcium is released into the solution when the calcium salt is hydrated. Liotta et al do not show examples utilizing a caged calcium compound, and do not anticipate the problems related therein – specifically, that the calcium caged within the caged calcium compound is triggered with light. Although Liotta teaches the potential use of caged calcium compounds as a way of activating the calcium activated luminescent material, Liotta is flawed and thus teaches away from the present invention. Liotta teaches that 10 to 100 mM of calcium is necessary to trigger the calcium activated luminescent material. Liotta's method could therefore not be used with calcium caging compounds, since, to have that much calcium released from the calcium caging compounds, there would inevitably be some 'bleeding' of calcium from those compounds and it would be impossible to have that much calcium released and not have a level of free calcium below 20nM before the activation of the caging compounds. As the Applicant teaches, free calcium levels above 20 nM would prematurely activate the calcium activated luminescent material. Nothing in Liotta teaches how to use caging compounds to release calcium in amounts sufficient to emit light from calcium activated luminescent

material. Nothing in the caging compound literature (such as Ellis-Davies) teaches how to use caging compounds to release calcium in amounts sufficient to emit light from calcium activated luminescent materials. In addition, applying Liotta to Pankratz would simply not work in whole blood; as taught in the present disclosure, the blood cells and the free calcium need to be removed from the solution before the method will work.

Finally, none of the prior art teachings teach how to use a photomultiplier tube to collect light from calcium activated luminescent materials, when a UV light source of enough power to release calcium from calcium caging compounds is used to stimulate light generation from calcium activated luminescent materials.

An important aspect of the current invention is the teaching of how to differentiate between the light emitted to activate the cagec calcium compound, and the light emitted by the calcium-sensitive luminescent material. Neither Pankratz et al nor Liotta et al disclose resetting the photomultiplier (usec for measuring the light emitted by the calcium-sensitive luminescent material) between the time of the light activation of the caged calcium compound and the resulting activation of the calcium-sensitive luminescent material. Indeed, neither the problem solved nor the advantage obtained in resetting the photomultiplier is taught or suggested by the prior art. This step is taught at page 15, lines 19-30 of the present application and claimed in the present claims, as amended. Applicant submits that the claims, as amended are thus novel and non-obvious over the prior art, as the prior art doesn't even consider the problem the Applicant solves.

Applicant has amended claims 1, 2, 21 and 23 to add a step of resetting the photomultiplier between the ultraviolet light source emission and the emission of light by the calcium-sensitive luminescent material. Support for this step can be found at page 15, lines 19-30. Applicant respectfully submits that, due to their respective dependence on claims 1, 2, 21 or 23, the Examiners' objections to Claims 3-7, 10-12, 14-17, 22, 24-25 and 27 have also been addressed. Claim 19 has been cancelled by the applicant without prejudice.

The Examiner has objected to claim 26, stating that Liotta et al teach that the timing of the caged calcium can extend the length of the light pulse, and provides a technique for performing multiple assays at once. Applicant respectfully submits that this objection has been addressed, since claim 26 was cancelled without prejudice in the Applicant's last communication with the Patent Office.

The Examiner has objected to claims 41-48, stating that it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, and therefore it would have been obvious through normal optimization techniques known in the art to load the calcium-caging compound with up to 75% calcium, and for the free calcium concentration of the solution to be less than 20 nanomolars. Applicant respectfully submits that since these claims are dependent on claims 1, 2, 21, or 23, this objection has been addressed in amendments to those claims, as hereinbefore described.

The Examiner has objected to claims 8, 9, 13, 18, 20 and 49-54 as unpatentable over Pankratz et al in view of Liotta et al and further in view of Ellis-Davies et al [US 5,446,186]. Specifically, the Examiner has stated that, with respect to claims 13 and 49-54, Pankratz et al and Liotta et al teach a method of a binding assay as discussed above involving the use of aequorin and obelin and of caged calcium compounds. Though the Examiner concedes that neither Pankratz et al nor Liotta et al teach specific caged calcium compounds, he states that Ellies-Davies et al does teach DM-nitrophen and NP-EGTA as well known in the art as calcium chelating compounds. The Examiner contends that it would therefore have been obvious to use DM-nitrophen or NP-EGTA as the caged calcium compounds in the method of Pankratz et al and Liotta et al, as described previously.

The Applicant respectfully submits that the hereinbefore-described amendments to claims 1, 2, 21 and 23 (from which claims 13 and 49-54 depend) address these objections.

The Examiner has objected to claims 8, 9, 18 and 20, stating that Liotta teaches the use of ultraviolet light, which can be in the form of a light pulse, to activate the caged calcium compound. Ellis-Davies et al further specify the use of a laser at 347 nm to liberate the calcium. Finally, Liotta teaches use of a photomultiplier to sense the luminescence of aequorin.

The Applicant respectfully submits that the hereinbefore-described amendments to claims 1, 2, 21 and 23 (from which claims 8, 9, 18 and 20 depend) address these objections.

Amendments to Claims Not Specifically Addressing Examiner's Objections

The Applicant has further amended certain claims to better define the ambit of protection sought.

The elongated matrix and transverse stripe have been removed from claims 1, 2, 21, 23 and corresponding dependent claims.

Elements of claim 1 from which claim 2 depended have been added to claim 2, which has been made into an independent claim. Correspondingly, claims dependent on claim 1 are now dependent on claims 1 or 2.

Claim 5 has been amended to better define the invention.

Claim 8 has been amended to remove elements now incorporated into claims 1 and 2.

Claim 14 and 15 have been amended to clarify the invention.

Favourable reconsideration and allowance of this application are respectfully requested.

Should the Examiner believe however that additional amendments to the claims may be required to secure allowance of this application; he is invited to telephone the undersigned at the below-noted number to facilitate further prosecution of this application.

This response is being forwarded to you via facsimile transmission to the Patent Examination Section (Fax No.703-872-9306), with the original following by courier/regular mail and trust this will be in order.

Respectfully Submitted,

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